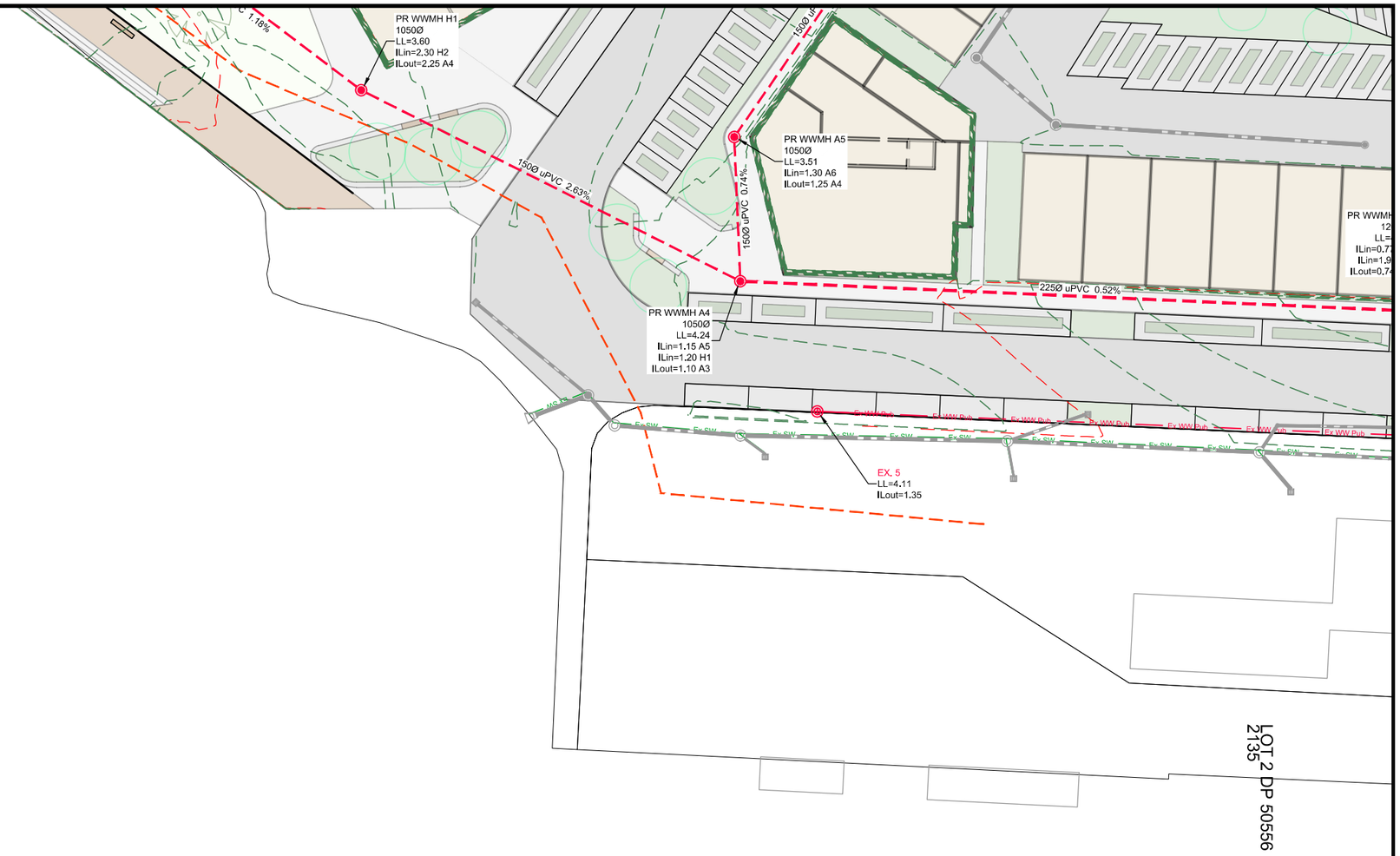


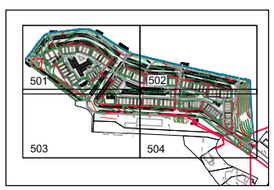
WASTEWATER NOTES:

1. ALL PUBLIC WASTEWATER WORKS TO BE IN ACCORDANCE WITH WATERCARE'S WASTEWATER CODE OF PRACTICE.
2. ALL PRIVATE WASTEWATER WORKS TO BE IN ACCORDANCE WITH AS/NZS 3500.2 (NZBC ACCEPTABLE SOLUTION G13/AS3).
3. CONTRACTOR TO CONFIRM ALL EXISTING SERVICES, AND ESTABLISH NECESSARY CONTROLS, PRIOR TO COMMENCEMENT OF CONSTRUCTION
4. ALL GRAVITY WASTEWATER PIPES SHALL BE uPVC SN16 IN ACCORDANCE WITH AS/NZS 1260 AND SHALL BE INSTALLED IN ACCORDANCE WITH AS/NZS 2566 OR WATERCARE'S CODE OF PRACTICE.
5. ALL WASTEWATER MANHOLES TO BE ROMOLD DN1000 OR APPROVED SIMILAR U.N.O.
6. ALL WASTEWATER MANHOLE LIDS TO BE CLASS D TO AS3996.
7. ALL WASTEWATER MANHOLES TO BE PROVIDED WITH STAINLESS STEEL SAFETY GRILLS IN ACCORDANCE WITH WATERCARE SPECIFICATIONS.

ABBREVATIONS

WW	WASTEWATER
MH	MANHOLE
CP	CESSPIT
LL	LID LEVEL
IL	INVERT LEVEL
EX	EXISTING
PR	PROPOSED

Original Size:
1:250
1:500 (A3)



No.	Revision Details (Current Revision Date : 14/01/2021)	Date
A	ISSUED FOR RESOURCE CONSENT	19/02/21

WASTEWATER LEGEND

- PROPOSED WASTEWATER
- PROPOSED WWMH
- Ex WW Pub — EXISTING WW LINE (PUBLIC)
- EXISTING WWMH
- RM — EXISTING RISING MAIN

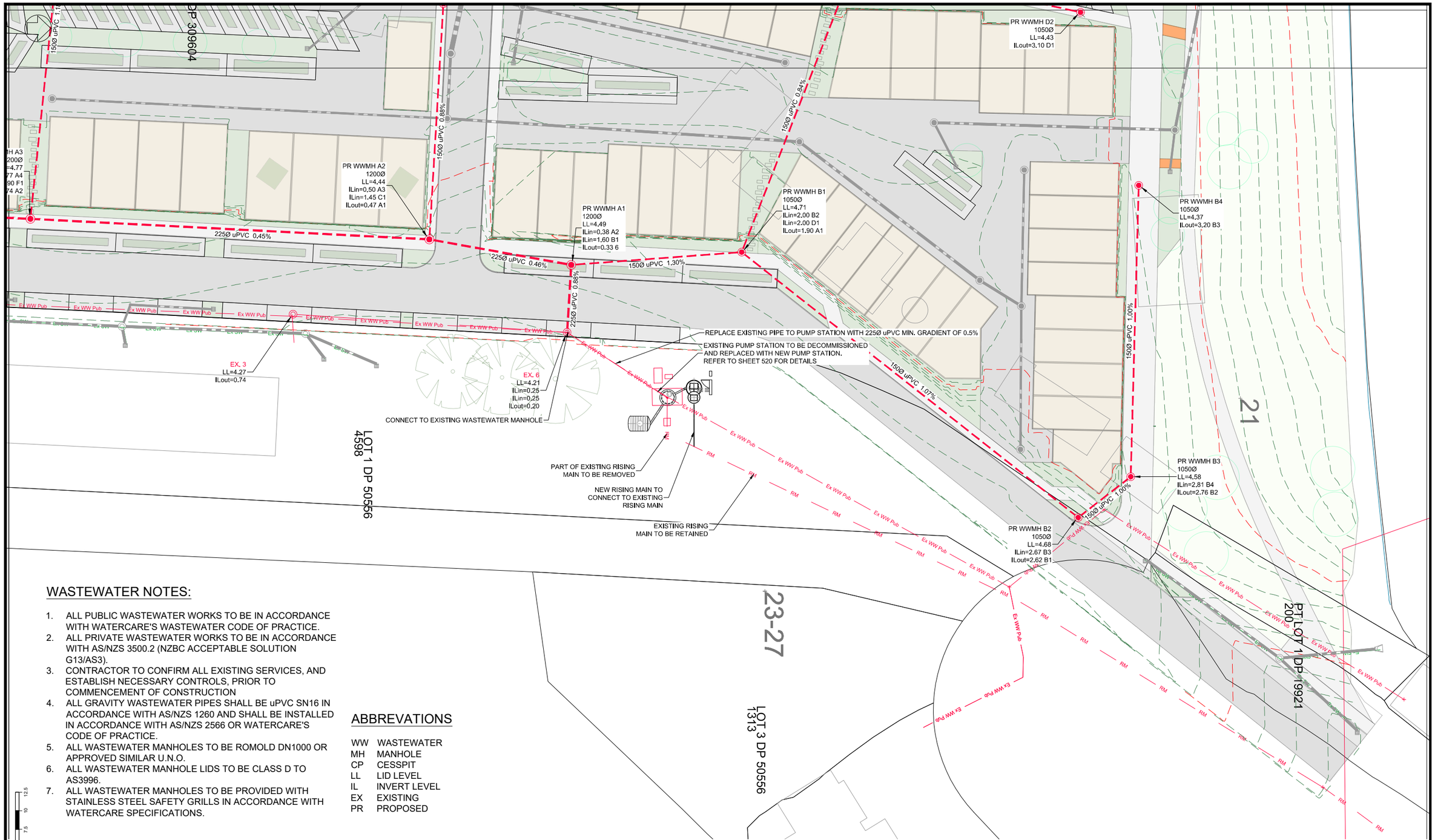
Design PS
Survey
Drawn TM
Checked ML
Date 14/01/2021
Scale 1:250 (A1) 1:500 (A3)
CAD Filename 12582-01-500.dwg

Job Title.
BAYSWATER MARINA HOLDINGS LTD
BAYSWATER MARITIME PRECINCT
21 SIR PETER BLAKE PARADE
BAYSWATER
AUCKLAND

AIREY CONSULTANTS LTD.
CONSULTING CIVIL & STRUCTURAL ENGINEERS
Takapuna, Pukekohe, Howick, Queenstown, Christchurch, Orewa
ACENZ

Drawing Title.
WASTEWATER PLAN 3 OF 4

File No.	Rev.	Dwg. No.
12582-01-500	A	503



WASTEWATER NOTES:

1. ALL PUBLIC WASTEWATER WORKS TO BE IN ACCORDANCE WITH WATERCARE'S WASTEWATER CODE OF PRACTICE.
2. ALL PRIVATE WASTEWATER WORKS TO BE IN ACCORDANCE WITH AS/NZS 3500.2 (NZBC ACCEPTABLE SOLUTION G13/AS3).
3. CONTRACTOR TO CONFIRM ALL EXISTING SERVICES, AND ESTABLISH NECESSARY CONTROLS, PRIOR TO COMMENCEMENT OF CONSTRUCTION
4. ALL GRAVITY WASTEWATER PIPES SHALL BE uPVC SN16 IN ACCORDANCE WITH AS/NZS 1260 AND SHALL BE INSTALLED IN ACCORDANCE WITH AS/NZS 2566 OR WATERCARE'S CODE OF PRACTICE.
5. ALL WASTEWATER MANHOLES TO BE ROMOLD DN1000 OR APPROVED SIMILAR U.N.O.
6. ALL WASTEWATER MANHOLE LIDS TO BE CLASS D TO AS3996.
7. ALL WASTEWATER MANHOLES TO BE PROVIDED WITH STAINLESS STEEL SAFETY GRILLS IN ACCORDANCE WITH WATERCARE SPECIFICATIONS.

ABBREVATIONS

WW	WASTEWATER
MH	MANHOLE
CP	CESSPIT
LL	LID LEVEL
IL	INVERT LEVEL
EX	EXISTING
PR	PROPOSED

Original Size:
1:250
1:500 (A3)

WASTEWATER LEGEND

- PROPOSED WASTEWATER
- PROPOSED WWMH
- Ex WW Pub — EXISTING WW LINE (PUBLIC)
- EXISTING WWMH
- RM — EXISTING RISING MAIN

No.	Revision Details (Current Revision Date : 14/01/2021)	Date
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Design PS
Survey
Drawn TM
Checked ML
Date 14/01/2021
Scale 1:250 (A1) 1:500 (A3)
CAD Filename 12582-01-500.dwg

Job Title.
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BAYSWATER MARITIME PRECINCT
21 SIR PETER BLAKE PARADE
BAYSWATER
AUCKLAND

AIREY CONSULTANTS LTD.
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Drawing Title.
WASTEWATER PLAN 4 OF 4

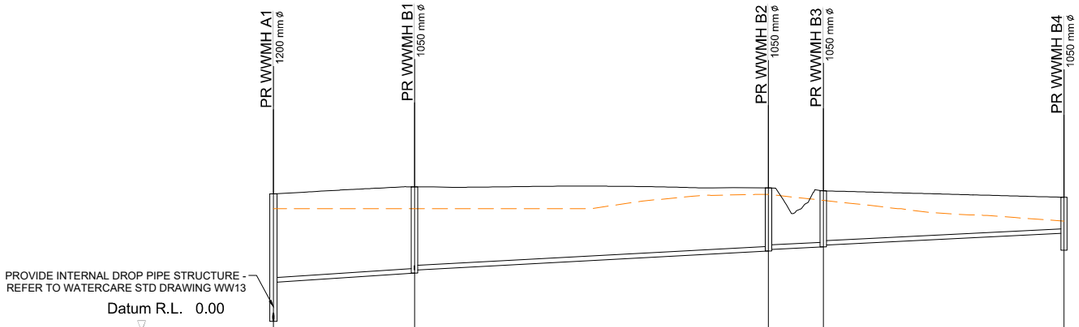
File No.	Rev.	Dwg. No.
12582-01-500	A	504

Datum R.L. 0.00

CAPACITY (L/S)		48.7 l/s	34.2 l/s	32.9 l/s	35.3 l/s	14.8 l/s	14.8 l/s	14.9 l/s	17.2 l/s	16.8 l/s	16.8 l/s	16.8 l/s
SURFACE TO INVERT (m)	4.01	4.16	3.97	4.03	3.14	2.26	1.70	1.72	2.22	2.22	1.99	1.43
INVERT LEVELS	0.25	0.33 / 0.38	0.47 / 0.50	0.74 / 0.77	1.10 / 1.15	1.25 / 1.30	1.53 / 1.58	1.75 / 1.80	2.10 / 2.15	2.47 / 2.52	2.77 / 2.82	3.10
SURFACE LEVELS (Design)	4.21	4.49	4.44	4.77	4.24	3.51	3.23	3.47	4.32	4.69	4.76	4.53
CHAINAGE PIPE LENGTH (m)	0.00	(7.98) 9.10	(18.22) 28.52	(52.60) 82.31	(62.75) 146.18	(12.50) 159.74	(28.55) 189.33	(20.94) 211.32	(27.48) 239.84	(30.75) 271.65	(24.06) 296.75	(27.03) 324.83
PIPE GRADE (%)		DN 225 uPVC 0.88% Granular Bedding	DN 225 uPVC 0.46% Granular Bedding	DN 225 uPVC 0.45% Granular Bedding	DN 225 uPVC 0.52% Granular Bedding	DN 150 uPVC 0.74% Granular Bedding	DN 150 uPVC 0.78% Granular Bedding	DN 150 uPVC 0.77% Granular Bedding	DN 150 uPVC 1.05% Granular Bedding	DN 150 uPVC 1.01% Granular Bedding	DN 150 uPVC 1.00% Granular Bedding	DN 150 uPVC 1.00% Granular Bedding
BEDDING												

Scale Horizontal 1:500 Vertical 1:100 (A1)
Horizontal 1:1000 Vertical 1:200 (A3)

LONGITUDINAL SECTION - WW LINE A

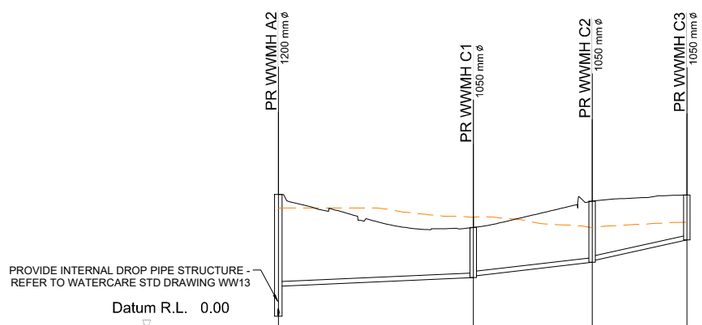


Datum R.L. 0.00

CAPACITY (L/S)		19.3 l/s	17.3 l/s	17.6 l/s	16.7 l/s	
SURFACE TO INVERT (m)	4.16	2.81	2.06	1.82	1.73	
INVERT LEVELS	1.60	1.90 / 2.00	2.62 / 2.67	2.76 / 2.81	3.20	
SURFACE LEVELS (Design)	4.49	4.71	4.68	4.58	4.37	
CHAINAGE PIPE LENGTH (m)	0.00	(21.90) 23.02	(56.67) 80.73	(7.91) 89.69	(38.20) 128.94	
PIPE GRADE (%)		DN 150 uPVC 1.30% Granular Bedding	DN 150 uPVC 1.07% Granular Bedding	DN 150 uPVC 1.00% Granular Bedding	DN 150 uPVC 1.00% Granular Bedding	
BEDDING						

Scale Horizontal 1:500 Vertical 1:100 (A1)
Horizontal 1:1000 Vertical 1:200 (A3)

LONGITUDINAL SECTION - WW LINE B



Datum R.L. 0.00

CAPACITY (L/S)		15.8 l/s	25.8 l/s	35.8 l/s
SURFACE TO INVERT (m)	3.97	1.64	2.00	1.47
INVERT LEVELS	1.45	1.73 / 1.78	2.23 / 2.28	2.96
SURFACE LEVELS (Design)	4.44	3.37	4.23	4.43
CHAINAGE PIPE LENGTH (m)	0.00	(30.68) 31.81	(18.33) 51.19	(14.40) 66.63
PIPE GRADE (%)		DN 150 uPVC 0.88% Granular Bedding	DN 150 uPVC 2.32% Granular Bedding	DN 150 uPVC 4.40% Granular Bedding
BEDDING				

Scale Horizontal 1:500 Vertical 1:100 (A1)
Horizontal 1:1000 Vertical 1:200 (A3)

LONGITUDINAL SECTION - WW LINE C

Original Size:
1:500
1:1000 (A3)

No.	Revision Details (Current Revision Date : 14/01/2021)	Date
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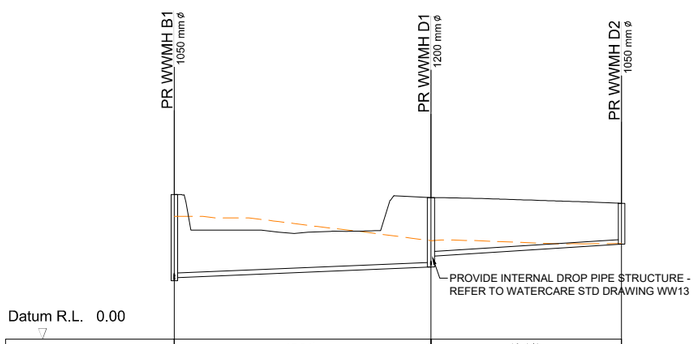
Design PS
Survey
Drawn TM
Checked ML
Date 14/01/2021
Scale 1:500 (A1) 1:1000 (A3)
CAD Filename 12582-01-500.dwg

Job Title.
BAYSWATER MARINA HOLDINGS LTD
BAYSWATER MARITIME PRECINCT
21 SIR PETER BLAKE PARADE
BAYSWATER
AUCKLAND

AIREY CONSULTANTS LTD.
CONSULTING CIVIL & STRUCTURAL ENGINEERS
Takapuna, Pukekohe, Howick, Queenstown, Christchurch, Orewa
ACENZ

Drawing Title.
WASTEWATER LONGITUDINAL SECTIONS 1 OF 2

File No. **12582-01-500** | Rev. **A** | Dwg. No. **510**

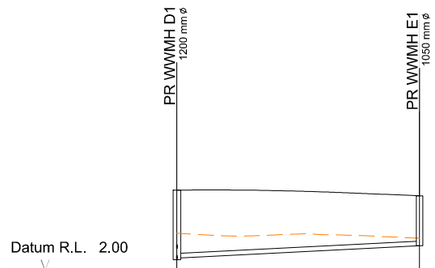


Datum R.L. 0.00

CAPACITY (L/S)		15.3 l/s		19.1 l/s		
SURFACE TO INVERT (m)	2.81		2.26		1.33	
INVERT LEVELS	2.00		2.35 2.70		3.10	
SURFACE LEVELS (Design)	4.71		4.61		4.43	
CHAINAGE PIPE LENGTH (m)	0.00	(40.74)	41.87	(29.96)	72.94	
PIPE GRADE (%)		DN 150 uPVC 0.84% Granular Bedding		DN 150 uPVC 1.29% Granular Bedding		
BEDDING						

Scale Horizontal 1:500 Vertical 1:100 (A1)
Horizontal 1:1000 Vertical 1:200 (A3)

LONGITUDINAL SECTION - WW LINE D

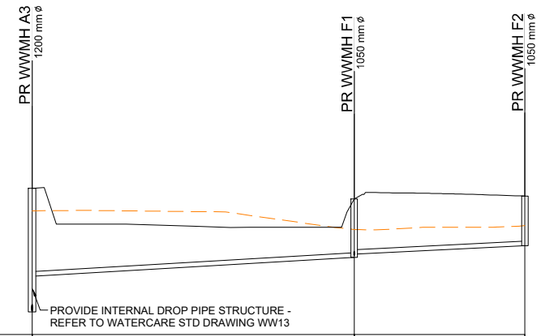


Datum R.L. 2.00

CAPACITY (L/S)		16.8 l/s	
SURFACE TO INVERT (m)	2.26		1.63
INVERT LEVELS	2.40		2.80
SURFACE LEVELS (Design)	4.61		4.43
CHAINAGE PIPE LENGTH (m)	0.00	(38.44)	39.56
PIPE GRADE (%)		DN 150 uPVC 1.01% Granular Bedding	
BEDDING			

Scale Horizontal 1:500 Vertical 1:100 (A1)
Horizontal 1:1000 Vertical 1:200 (A3)

LONGITUDINAL SECTION - WW LINE E

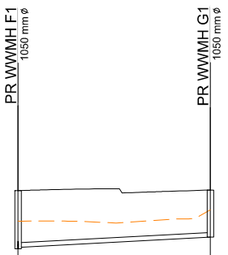


Datum R.L. 0.00

CAPACITY (L/S)		18.1 l/s		16.9 l/s
SURFACE TO INVERT (m)	4.03		1.90	1.62
INVERT LEVELS	1.90		2.52 2.62	2.90
SURFACE LEVELS (Design)	4.77		4.42	4.52
CHAINAGE PIPE LENGTH (m)	0.00	(51.41)	52.53	(26.78) 80.36
PIPE GRADE (%)		DN 150 uPVC 1.18% Granular Bedding		DN 150 uPVC 1.01% Granular Bedding
BEDDING				

Scale Horizontal 1:500 Vertical 1:100 (A1)
Horizontal 1:1000 Vertical 1:200 (A3)

LONGITUDINAL SECTION - WW LINE F



Datum R.L. 2.00

CAPACITY (L/S)		17.2 l/s	
SURFACE TO INVERT (m)	1.90		1.54
INVERT LEVELS	2.57		2.90
SURFACE LEVELS (Design)	4.42		4.44
CHAINAGE PIPE LENGTH (m)	0.00	(30.31)	31.36
PIPE GRADE (%)		DN 150 uPVC 1.05% Granular Bedding	
BEDDING			

Scale Horizontal 1:500 Vertical 1:100 (A1)
Horizontal 1:1000 Vertical 1:200 (A3)

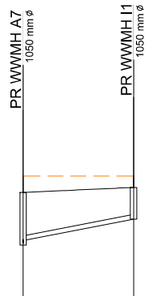
LONGITUDINAL SECTION - WW LINE G

Datum R.L. 0.00

CAPACITY (L/S)		27.1 l/s	18.2 l/s	17.1 l/s
SURFACE TO INVERT (m)	3.14	1.36	0.91	0.99
INVERT LEVELS	1.20	2.25 2.30	2.63 2.68	3.05
SURFACE LEVELS (Design)	4.24	3.60	3.54	4.04
CHAINAGE PIPE LENGTH (m)	0.00	(38.83) 38.88	(27.01) 67.93	(34.37) 103.35
PIPE GRADE (%)		DN 150 uPVC 2.63% Granular Bedding	DN 150 uPVC 1.18% Granular Bedding	DN 150 uPVC 1.04% Granular Bedding
BEDDING				

Scale Horizontal 1:500 Vertical 1:100 (A1)
Horizontal 1:1000 Vertical 1:200 (A3)

LONGITUDINAL SECTION - WW LINE H



Datum R.L. 0.00

CAPACITY (L/S)		33.5 l/s	
SURFACE TO INVERT (m)	1.72		1.03
INVERT LEVELS	1.58 1.96		2.60
SURFACE LEVELS (Design)	3.47		3.63
CHAINAGE PIPE LENGTH (m)	0.00	(16.94)	(16.97) 18.02
PIPE GRADE (%)		DN 150 uPVC 3.89% Granular Bedding	
BEDDING			

Scale Horizontal 1:500 Vertical 1:100 (A1)
Horizontal 1:1000 Vertical 1:200 (A3)

LONGITUDINAL SECTION - WW LINE I

Original Size:
1:500
1:1000 (A3)

No.	Revision Details	(Current Revision Date : 14/01/2021)	Date
A	ISSUED FOR RESOURCE CONSENT		19/02/21

Design	PS
Survey	
Drawn	TM
Checked	ML
Date	14/01/2021
Scale	1:500 (A1) 1:1000 (A3)
CAD Filename	12582-01-500.dwg

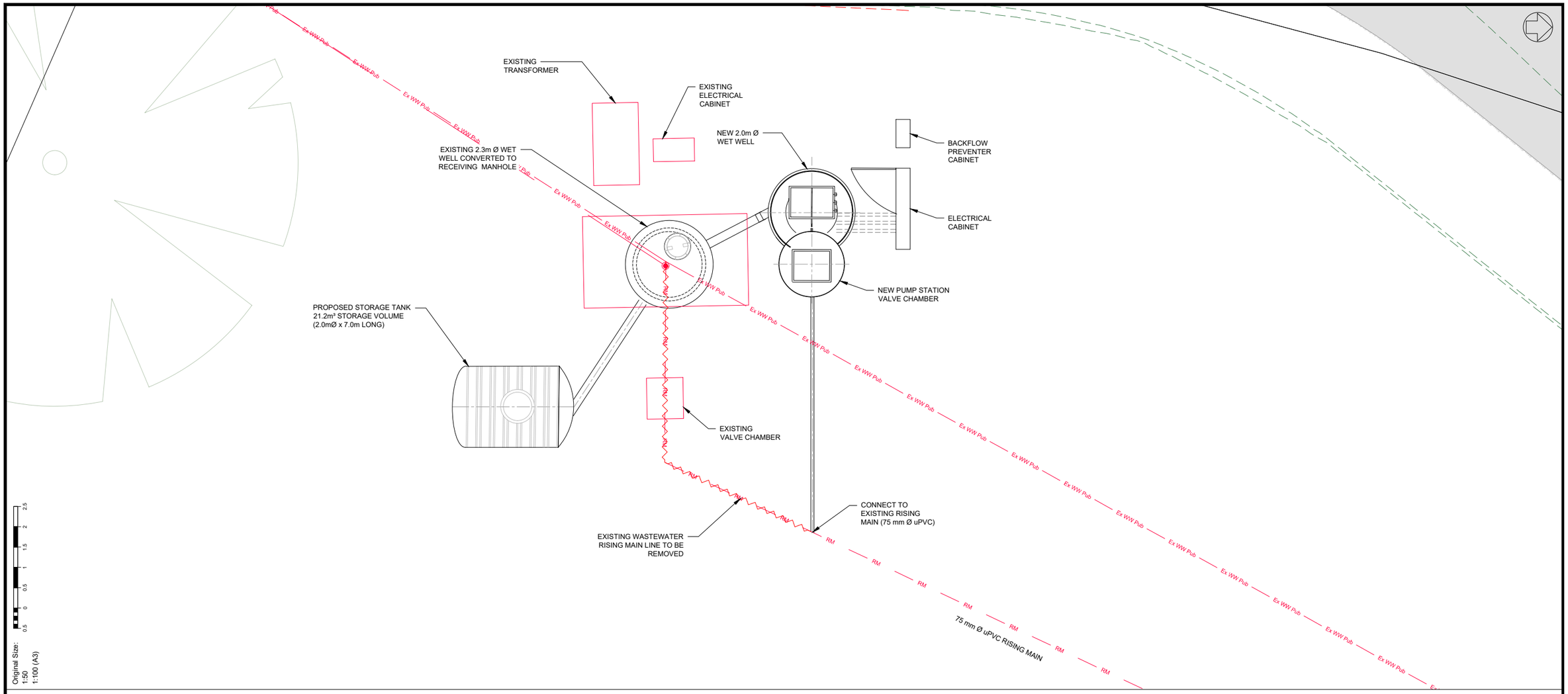
RC

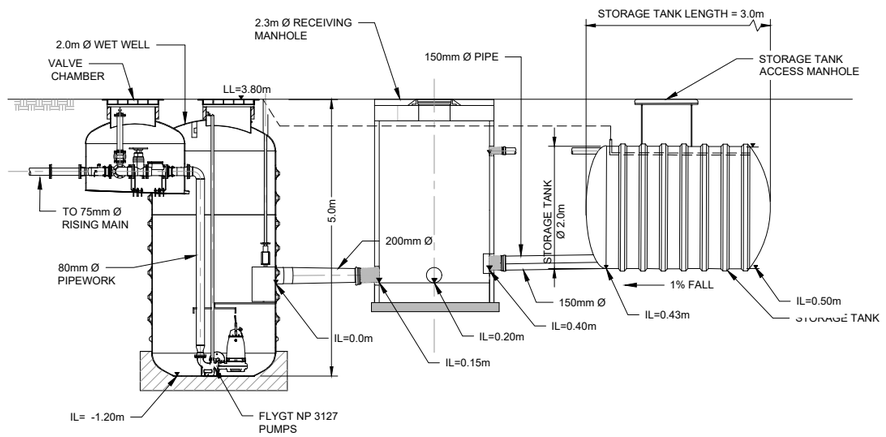
Job Title.
BAYSWATER MARINA HOLDINGS LTD
BAYSWATER MARITIME PRECINCT
21 SIR PETER BLAKE PARADE
BAYSWATER
AUCKLAND

AIREY CONSULTANTS LTD.
CONSULTING CIVIL & STRUCTURAL ENGINEERS
Tākapuna, Pukekohe, Howick, Queenstown, Christchurch, Orewa
ACENZ

Drawing Title.
WASTEWATER LONGITUDINAL SECTIONS 2 OF 2

File No.	Rev.	Dwg. No.
12582-01-500	A	511





PUMP STATION TYPICAL SECTION

1:50 (A1), 1:100 (A3)

ABBREVATIONS

WW	WASTEWATER
MH	MANHOLE
CP	CESSPIT
LL	LID LEVEL
IL	INVERT LEVEL
EX	EXISTING
PR	PROPOSED

WASTEWATER NOTES:

1. ALL WASTEWATER WORKS TO BE IN ACCORDANCE WITH WATERCARE'S WASTEWATER CODE OF PRACTICE
2. ALL WORKS ARE IN CONJUNCTION WITH PROJECT SPECIFICATION
3. LEVELS ARE IN TERMS OF MEAN SEA LEVEL (AUCKLAND VERTICAL DATUM 1946)
4. COORDINATES ARE IN TERMS OF NZGD 2000 (MT. EDEN CIRCUIT)
5. CONTRACTOR TO CONFIRM ALL EXISTING SERVICES, AND ESTABLISH NECESSARY CONTROLS, PRIOR TO COMMENCEMENT OF CONSTRUCTION
6. REFER TO DRAWING 500-504 FOR PROPOSED WASTEWATER PLANS
7. REFER TO DRAWING 510-511 FOR PROPOSED WASTEWATER LONG SECTIONS
8. ON COMPLETION OF WORKS, ALL AREAS OF CONSTRUCTION WORKS TO BE REINSTATED TO COUNCIL ENGINEERS STANDARDS AND ENGINEERS SATISFACTION

No.	Revision Details (Current Revision Date : 14/01/2021)	Date
A	ISSUED FOR RESOURCE CONSENT	19/02/21

WASTEWATER LEGEND

- PROPOSED WASTEWATER
- PROPOSED WWMH
- Ex WW Pub — EXISTING WW LINE (PUBLIC)
- EXISTING WWMH
- RM — EXISTING RISING MAIN

Design	PS
Survey	
Drawn	TM
Checked	ML
Date	14/01/2021
Scale	1:50 (A1) 1:100 (A3)
CAD Filename	12582-01-500.dwg

RC

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21 SIR PETER BLAKE PARADE
BAYSWATER
AUCKLAND

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CONSULTING CIVIL & STRUCTURAL ENGINEERS
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ACENZ

Drawing Title.
WASTEWATER PUMP STATION

File No.	Rev.	Dwg. No.
12582-01-500	A	520

Appendix 2

Options Assessment

BAYSWATER MARITIME PRECINCT DEVELOPMENT – WASTEWATER PUMP STATION OPTIONS ASSESSMENT

	OPTION 1 – Retain Existing WW Pump Station		OPTION 2 – New WW Pump Station	
	Advantages	**Disadvantages**	**Advantages**	**Disadvantages**
Design	• Calculations have been completed which show an increase in pump size is practical. • Retain the existing wetwell and valve chamber.	• Minimum pump volume is limited and will restrict the ability to change operating levels and volumes in the future. • Additional pump-out and suck-out features need to be installed to meet Watercare standards. • A new electrical cabinet is required. • A longer additional emergency storage tank is required (11m) due to incoming manhole depth.	• Designed to meet Watercare standards • The existing wetwell will be re-used as the receiving manhole and is included emergency storage calculations to reduce the size of the additional storage tank.	• An addition emergency storage tank of 3m is required.
Construction	• Install new pumps. • The new pumps will fit in the existing wetwell with new bases and lower vertical pipework. • New Electrical cabinet can be located adjacent to the existing cabinet and be connected and tested prior to bringing the new pump station on line.	• The pump station will need to be taken off line to install new pumps and to make changes to the wetwell to meet current design standards. • Bypass pumping or sucker trucks will be required to manage the flows during construction. • Current operating levels of the pump station cause wastewater to back up in the existing gravity reticulation. Although the new pumps will have the capacity for the proposed flows, the pump volume will be limited and pump starts may be compromised along with any future changes which may be required.	• Pump station can be installed adjacent to existing wetwell without affecting the operation of the current pump station. • New Electrical cabinet can be located adjacent to new WW and be connected and tested prior to bringing the new pump station on line.	

Wetwell/Valve Chamber	• Existing wetwell to be used. • Existing valve chamber to be used	• Current operating levels of the pump station cause wastewater to back up in the existing gravity reticulation. • The operating levels can be adjusted to accept the proposed minimum pump volume, however the wetwell capacity is limited and will restrict the ability to change operating levels and volumes in the future.	• Designed to meet Watercare standards • Single wetwell and valve chamber design to minimize excavation footprint.	• New excavation for pump station is required on site.
Emergency Storage	• Gravity fill and empty	• Additional storage to connect to existing MH to minimize additional penetrations into the wetwell. • A longer additional emergency storage tank is required (11m) due to incoming manhole depth and tank size.	• Gravity fill and empty • The existing wetwell will be converted to a receiving manhole and provides additional emergency storage to minimize the size of the storage tank. • The proposed storage will connect to the receiving MH.	• An addition emergency storage tank of 3m length is required.
Electrical	• New control cabinet will meet Watercare Standards. • New Electrical cabinet can be located adjacent to the existing cabinet and be connected and tested prior to bringing the new pumps on line.		• New control cabinet will meet Watercare Standards. • New Electrical cabinet can be located adjacent to new WW and be connected and tested prior to bringing the new pump station on line.	
Ground Conditions		• Fill may be encountered however a Geotechnical assessment will be able to confirm ground conditions and construction methodology. • Excavation 3.0m for storage tank.		• Fill may be encountered however a Geotechnical assessment will be able to confirm ground conditions and construction methodology. • Excavation 5.5m for pump station and 3.5m for storage tank.

Appendix 3

Preliminary Calculations and Pump Selection Curve

Bayswater Marina - Wastewater Flows

Residential

	Population		Occupancy	Volume (l/p/d)		ADWF (l/s)	PF	PWWF (l/s)
Terrace	94		3	180		0.59	6.7	3.94
Apartments (3 storeys with commercial below)	27		3	180		0.17	6.7	1.13
					Sub Total	**0.76**		**5.07**

Commercial/Industrial - New Comercial - 1300m² - Assume 60% dry retail & 40% wet retail

	Area (m²)	m²/person	Occupancy	Volume (l/p/d)	Volume (l/m²/d)	ADWF (l/s)	PF	PWWF (l/s)
Dry Commercial (@50m² per person)	383.19	50	7.6638	65		0.01	1	0.01
Wet Commercial (@15l/m²/d)	77.02				15	0.01	1	0.01
					Sub Total	**0.02**		**0.02**

Existing Commercial/Industrial Facilities

	Area (m²)	m²/person	Occupancy	Volume (l/p/d)	Volume (l/m²/d)	ADWF (l/s)	PF	PWWF (l/s)
Old Yacht Club (community @ 10l/seat/day)	350		350	10		0.04	6.7	0.27
Dry Commercial (@50m² per person)	140	50	2.8	65		0.00	1	0.00
Industrial (light water usage)	470				4.5	0.02	1	0.02
					Sub Total	**0.07**		**0.30**

Additional Facilities

	No. Boats/Ferry Trips	Volume (per boat)	People/trip	Volume (l/p/d)		ADWF (l/s)	PF	PWWF (l/s)
Boat Pump Out	10	150				0.02	1	0.02
Ferry (toilet usage)	46		10	6		0.03	1	0.03
					Sub Total	**0.05**		**0.05**
					TOTAL	**0.89**		**5.43**

BAYSWATER MARITIME VILLAGE WASTEWATER PUMPING STATION SUMMARY DETAILS

DESIGN FLOWS

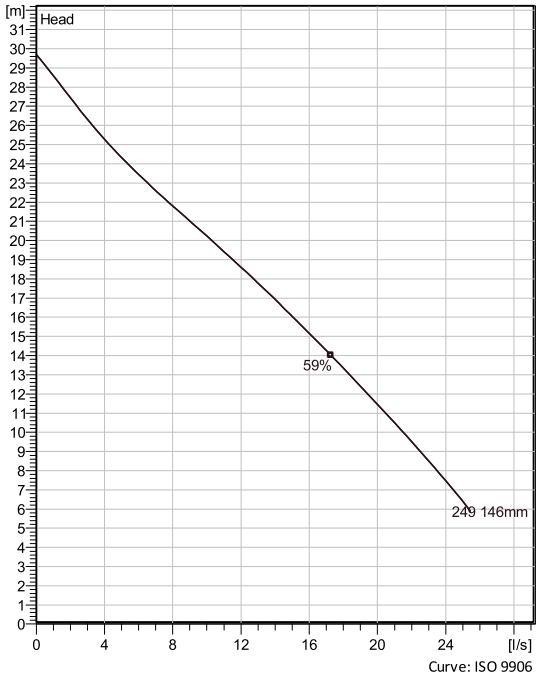
SECTION 1 - DAILY FLOW DESIGN	Design	Flygt Curves		
ADWF	**0.89**		l/s	
PWWF (Prop. Residential)	**5.07**		l/s	
PWWF (Prop. Commercial/Industrial)	**0.02**		l/s	
PWWF (Exist. Commercial/Industrial)	**0.30**		l/s	
PWWF (Add. Facilities)	**0.05**		l/s	
TOTAL PWWF l/s	**5.44**	**5.47**	l/s	Flygt duty Point 5.47l/s
SECTION 2 - STORAGE				
Storage Required (8 hrs ADWF)	**25.63**		m^3	
			m^3	
SECTION 3 - STATIC HEAD				
LL Pump Station (m)	3.8	3.8	m	
Depth to invert (m)	4.8	4.8	m	
RL Invert	-1.0	-1.0	m	
GL at Discharge (m)	15.6	15.6	m	
Depth to invert (m)	1.2	1.2	m	
RL Invert	14.4	14.4	m	
Static Head (m)	**15.4**	**15.4**	m	
Rising Main Length (m)	484	484	m	
SECTION 4 - RISING MAIN				
Static Head	15	15	m	
Length of Rising Main	484	484	m	
RM ø (80mm uPVC Class D)	79.7	79.7	mm	
HEAD LOSS				
Hazen-Williams friction loss calculation (PE pipe 140)				
C (uPVC Pipe C=140)	140	140		
Rising Main Head Loss	8.0	8.0	m	
Static Head	15	15	m	
Pump Station valves etc.	0.3	0.3	m	
Air valves & bends etc.	0.1	0.1	m	
HEAD REQUIRED SECTION 1 =	**23.7**	**23.8**	m	
WASTEWATER VELOCITY IN THE RISING MAIN				
Rising main area	0.005	0.005	m^2	
Velocity in pipe	**1.09**	**1.10**	m/s	
SECTION 6 - TOTAL HEAD REQUIRED =	**23.7**	**23.8**	m	
SECTION 7 - TOTAL PUMP STATION DUTY REQUIRED				
Pump Station Duty	**5.4**	**5.5**	l/sec	

NP 3127 SH 3~ Adaptive 249

Patented self cleaning semi-open channel impeller, ideal for pumping in most waste water applications. Possible to be upgraded with Guide-pin® for even better clogging resistance. Modular based design with high adaptation grade.

Technical specification

Curves according to: Water, pure ,4 °C,999.9 kg/m³,1.5692 mm²/s



Curve: ISO 9906

Configuration

Motor number
N3127.901 21-11-2AS-W IE3 8.5KW

Installation type
P - Semi permanent, Wet

Impeller diameter
146 mm

Discharge diameter
80 mm

Pump information

Impeller diameter
146 mm

Discharge diameter
80 mm

Inlet diameter
100 mm

Maximum operating speed
3000 rpm

Number of blades
2

Max. fluid temperature
40 °C

Materials

Impeller
Grey cast iron

Stator housing material
Grey cast iron

Project		**Created by**	Pieter Stellingwerf	**Last update**	12/16/2020
Block		**Created on**	12/16/2020		

NP 3127 SH 3~ Adaptive 249

Technical specification

Motor - General

Motor number N3127.901 21-11-2AS-W IE3 8.5KW	**Phases** 3~	**Rated speed** 3000 rpm	**Rated power** 8.5 kW
Approval No	**Number of poles** 2	**Rated current** 15 A	**Stator variant** 1
Frequency 50 Hz	**Rated voltage** 400 V	**Insulation class** H	**Type of Duty** S1
Version code 901			

Motor - Technical

Power factor - 1/1 Load 0.88	**Motor efficiency - 1/1 Load** 90.6 %	**Total moment of inertia** 0.0203 kg m²	**Starts per hour max.** 30
Power factor - 3/4 Load 0.87	**Motor efficiency - 3/4 Load** 91.0 %	**Starting current, direct starting** 116 A	
Power factor - 1/2 Load 0.81	**Motor efficiency - 1/2 Load** 89.6 %	**Starting current, star-delta** 38.6 A	

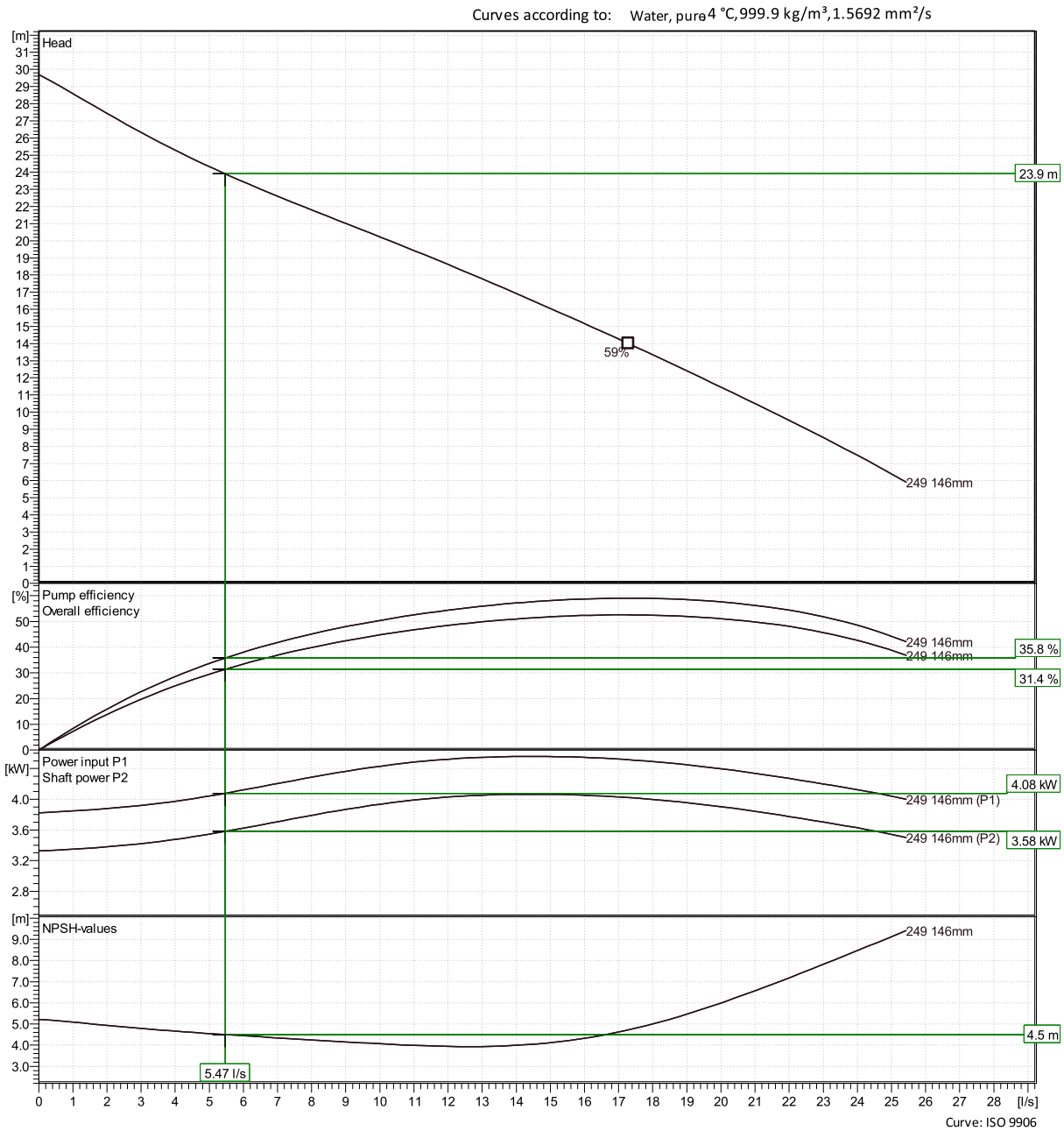
Project		**Created by**	Pieter Stellingwerf	**Last update**	12/16/2020
Block		**Created on**	12/16/2020		

NP 3127 SH 3~ Adaptive 249

Performance curve

Duty point

Flow	Head
5.47 l/s	23.9 m

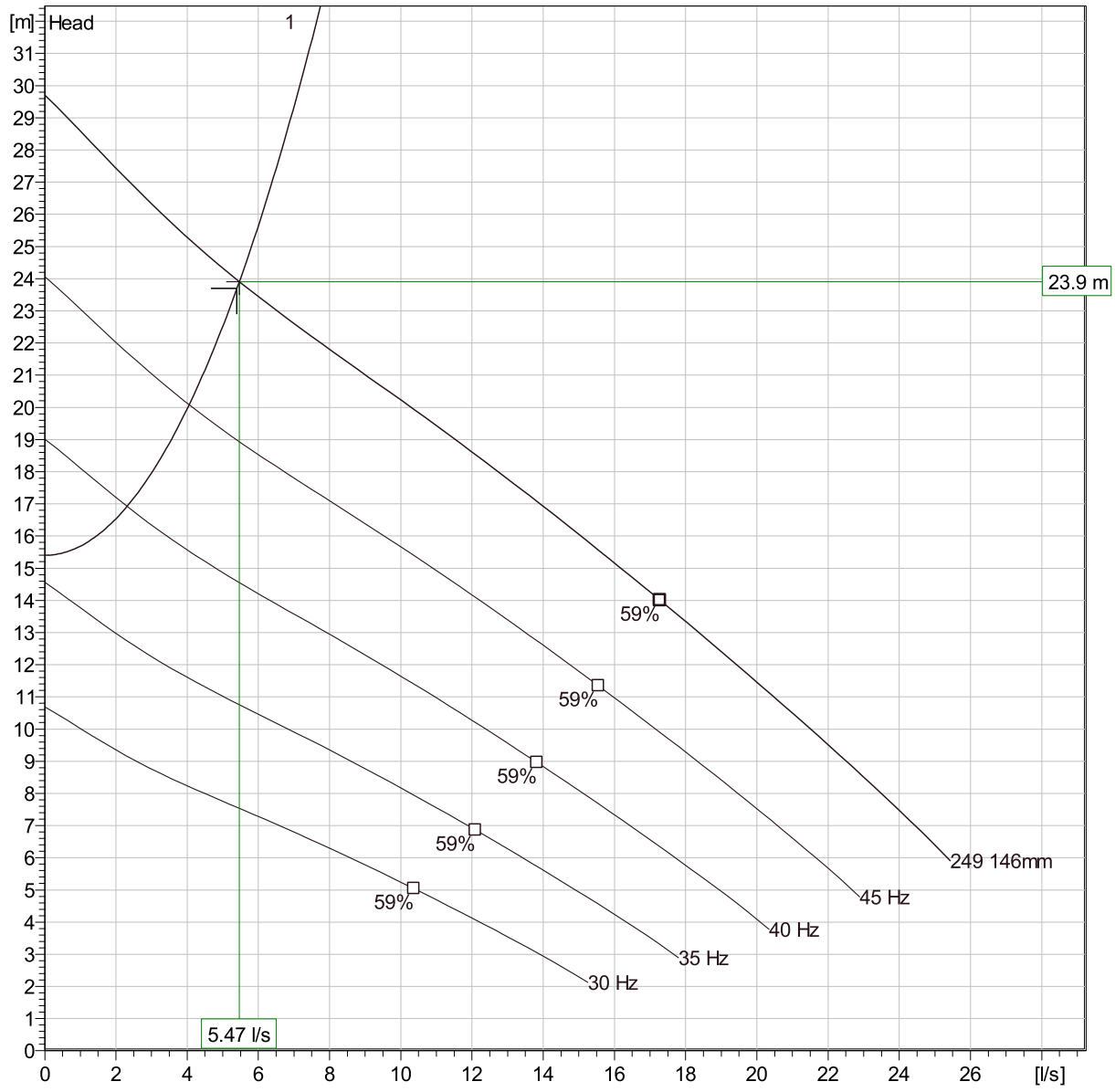


Project		**Created by**	Pieter Stellingwerf	**Last update**	12/16/2020
Block		**Created on**	12/16/2020		

NP 3127 SH 3~ Adaptive 249

Duty Analysis

Curves according to: Water, pure ,4 °C,999.9 kg/m³,1.5692 mm²/s



Operating characteristics

Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific Energy	NPSHre
1	5.47 l/s	23.9 m	3.58 kW	5.47 l/s	23.9 m	3.58 kW	35.8 %	0.207 kWh/m³	4.5 m

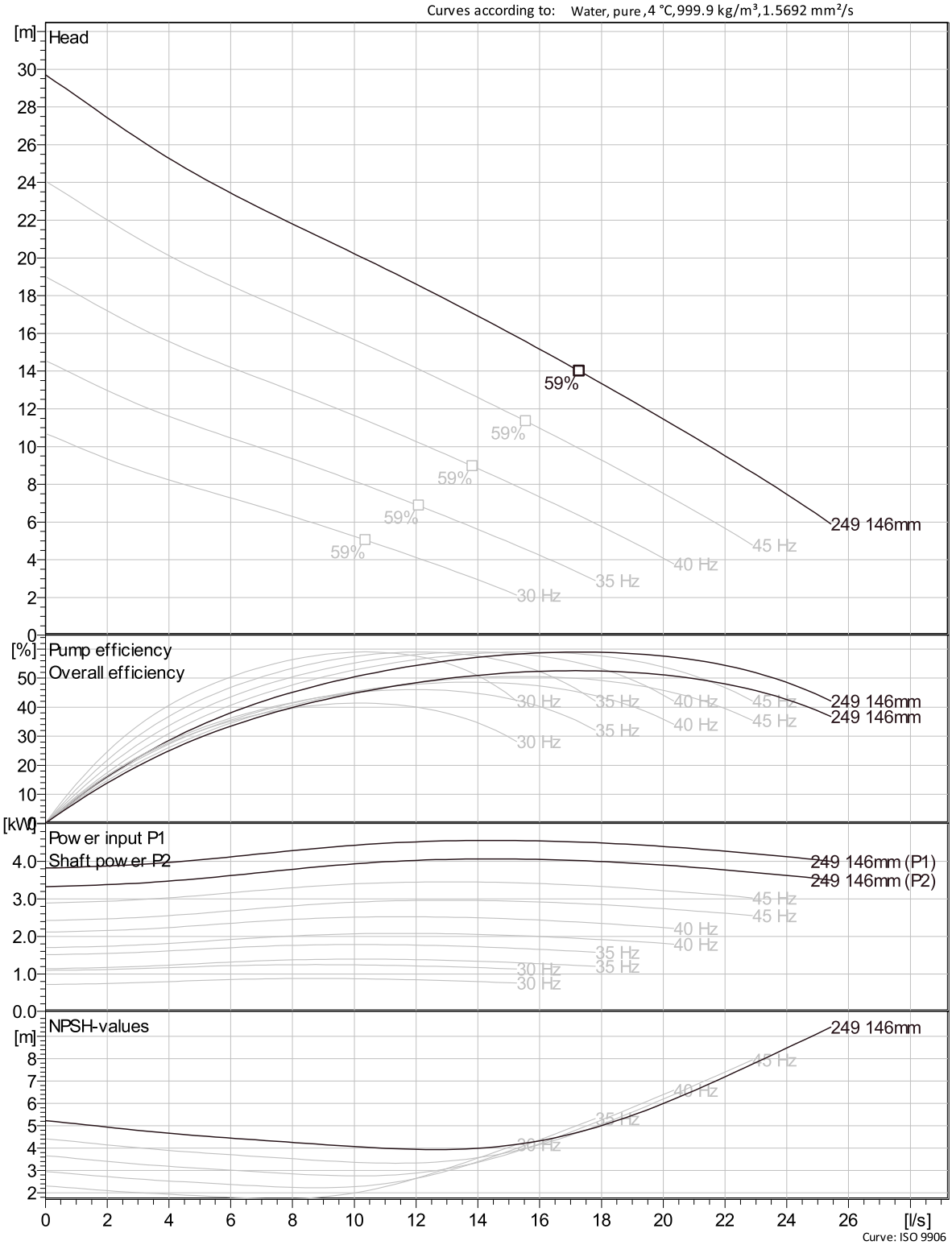
Project		**Created by**	Pieter Stellingwerf	**Last update**	12/16/2020
Block		**Created on**	12/16/2020		

NP 3127 SH 3~ Adaptive 249

VFD Curve

FLYGT
a xylem brand

Curves according to: Water, pure ,4 °C,999.9 kg/m³,1.5692 mm²/s

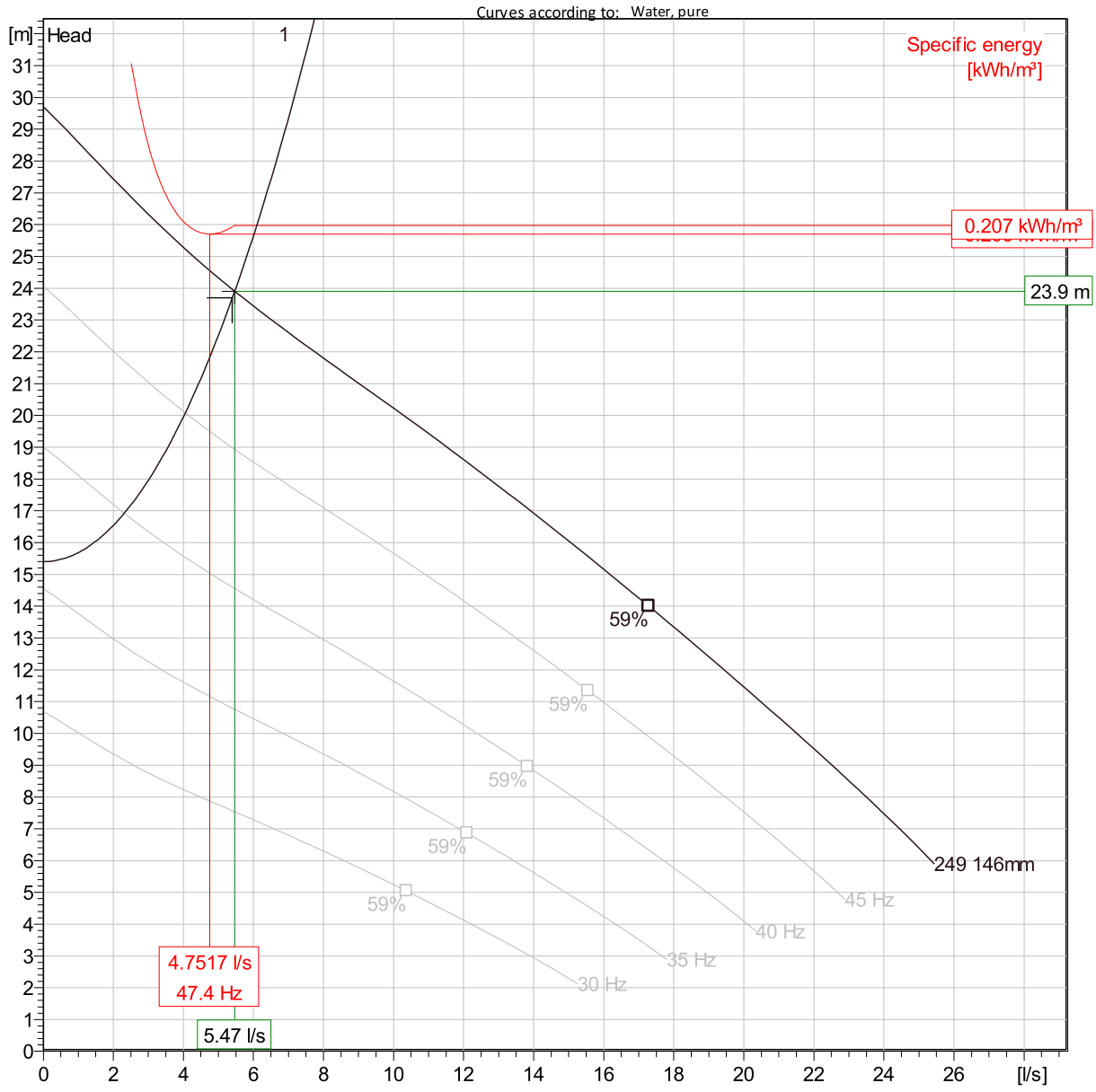


Curve: ISO 9906

Project		**Created by**	Pieter Stellingwerf	**Last update**	12/16/2020
Block		**Created on**	12/16/2020		

NP 3127 SH 3~ Adaptive 249

VFD Analysis



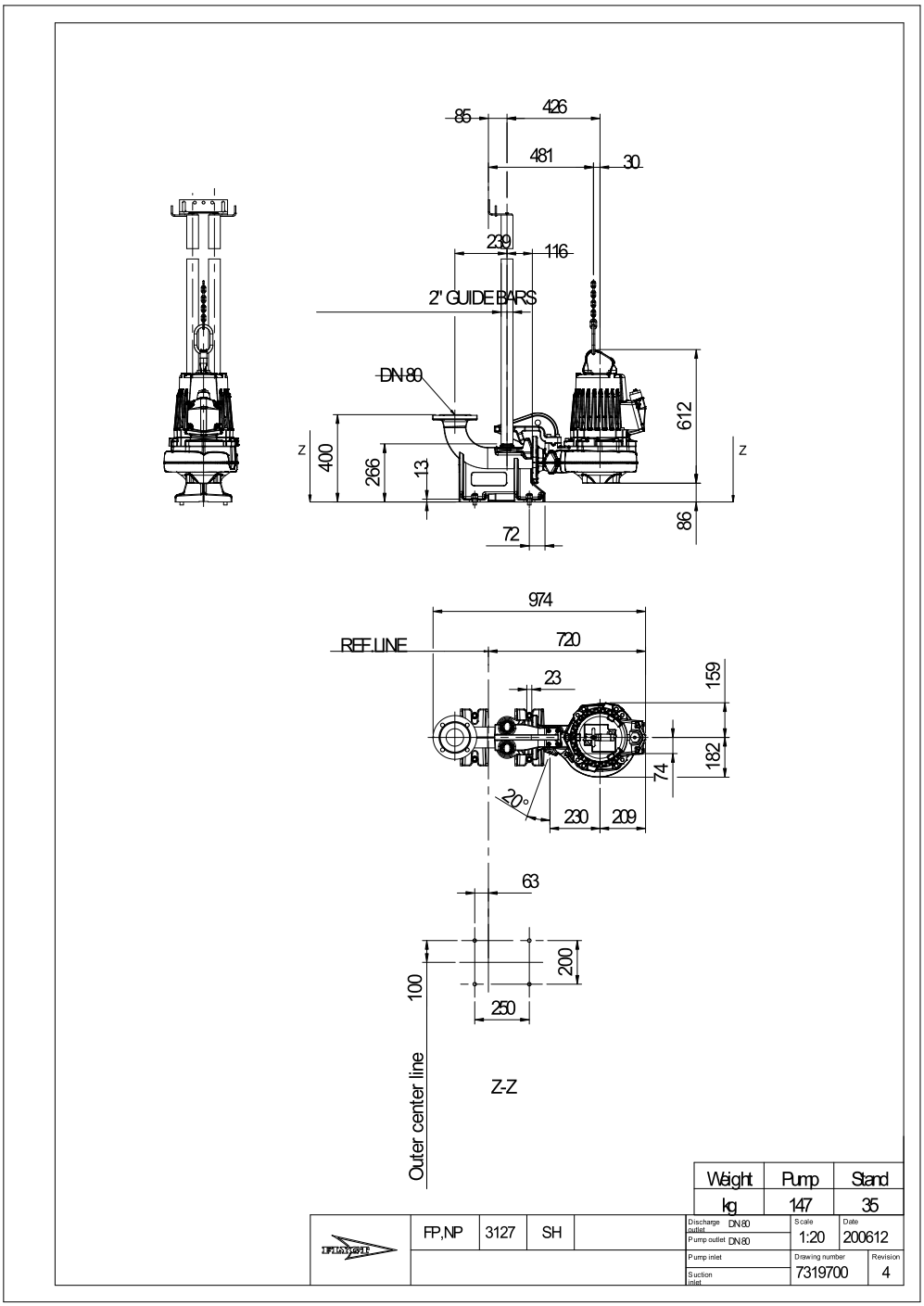
Operating characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific Energy	NPSHre
1	50 Hz	5.47 l/s	23.9 m	3.58 kW	5.47 l/s	23.9 m	3.58 kW	35.8 %	0.207 kWh/m	4.5 m
1	45 Hz	4.05 l/s	20.1 m	2.56 kW	4.05 l/s	20.1 m	2.56 kW	31.2 %	0.208 kWh/m	3.89 m
1	40 Hz	2.31 l/s	16.9 m	1.75 kW	2.31 l/s	16.9 m	1.75 kW	22 %	0.26 kWh/m³	3.36 m
1	35 Hz									
1	30 Hz									

Project		**Created by**	Pieter Stellingwerf	**Last update**	12/16/2020
Block		**Created on**	12/16/2020		

NP 3127 SH 3~ Adaptive 249

Dimensional drawing



Project		**Created by**	Pieter Stellingwerf	**Last update**	12/16/2020
Block		**Created on**	12/16/2020		

Appendix 4

Receiving Wastewater Capacity Calculations


MH - 414412
MH - 414410
MH - 414379
MH - 414387
MH - 414389
MH - 414382
MH - 414401
Lansdowne Street
Beresford Street
Bayswater Avenue
Norwood Road
Marine Terrace
Barbour Street

SANITARY SEWER CALCULATIONS

Project **Bayswater Marina Development**
Client
File No **12582/01**

DESIGN FLOW FORMULA:
q=Design Flow

PIPE CAPACITY FORMULA
Colebrook-White $V=-2\sqrt{(2gDS)}\log(ks/3.7D+2.51\upsilon/(D\sqrt{(2gDS)}))$
υ= 1.141 x10^6 kinematic viscosity of fluid (water at 15 degrees)
k_s= 1.5 mm (effective roughness)
D= diameter
S= hydraulic gradient
R= d/4 (circ. pipes)
Q= VA

Residential:	180	l/person/day ADWF (av. dry weather flow)	
	3.0	peaking factor	
	540	l/person/day ADF (Peak dry weather flow)	
	6.7	infiltration factor	
	1201	l/person/day PDF (Peak wet weather flow)	
	3.0	persons/lot	
PWWF	0.042	l/s/lot	

upstm MH No	d'stm MH No			Resid. Lots	DESIGN FLOW (l/s) Marina	Resid.	total	DESIGN FLOW	Grade S(%)	Dia D (m)	TOTAL Vel'y (m/s)	Pipe CAP'Y (l/s)	Pipe Dist (m)	Pipe upstm lvl (m)	PIPE d'stm lvl (m)
414401	414389		Marina Development	3	8.11	0.13	8.24	8.24	3.200	150	1.57	27.7	15.000	14.400	13.920
414389	414387		See separate spreadsheet	2		0.08	0.08	8.32	0.911	150	0.84	14.8	45.000	13.920	13.510
414387	414382			79		3.29	3.29	11.61	2.971	150	1.51	26.7	34.000	13.510	12.500
414382	414379			2		0.08	0.08	11.70	0.772	150	0.77	13.6	101.000	12.500	11.720
414379	414410			3		0.13	0.13	11.82	7.174	150	2.35	41.6	46.000	11.720	8.420
414410	414412			0		0.00	0.00	11.82	9.128	150	2.66	46.9	47.000	8.420	4.130
			Dwellings	**89**											

Appendix 5

CCTV


CCTV – MH 401877 to end
CCTV – MH 401877 to MH 414428
CCTV – MH 414428 to Pump Station
CCTV – MH 401878 to Pump Station
CCTV – MH 392902 to MH 401878
CCTV – MH 392903 to MH 392902
Pump Station
Sir Peter Blake Parade
401877
414428
401878
392902
392903
414385

PIPE IMAGE
David Sidwell
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Fax:
Email: pipeimage@gmail.com

Table of contents

Project Name:	Project number:	Date:	Contact:	
Bayswater Marina Public Se		3/03/2020		

Inspection: 1

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Log Sheet

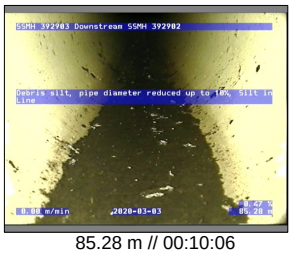
Job No.:	Asset No.:	Contractor.:	Surveyed by:	Date:	Weather:
	931261		**Ryan Winters**	**3/03/2020**	**Dry Weather**
Suburb:	Map / Dir. / Grid:	Page / Northings:	Ref. / Eastings:	Area:	System Code :
Bayswater					

Tot. Length:	**90.86 m**	Material:	**Polyvinyl chloride**	Year Laid:	
Direction:	**Downstream**	Shape:	**Circular pipe**	Purpose:	
Surface.:	**Hotmix**	Dia / HT.:	**150 mm**	Use:	**Foul/sanitary sewer**
Location.:	**Council road - carriageway**	Width:		Type:	

U/S MH/Node No.:	**SSMH 392903**	D/S MH/Node No.:	**SSMH 392902**
Street Name:	**Bayswater Marina**	Street Name:	**Bayswater Marina**
Depth:	**2.51**	Depth:	
US Node Type:	**Wastewater manhole**	DS Node Type:	**Wastewater manhole**

Remarks : **Check Condition**

1:720	Position	Code	Observation	Severity
SSMH 392903				
	0.00	IS	Inspection Starts / SSMH 392903	
	2.96	GC	General Comment / joint	
	14.63	GC	General Comment / joint	
	26.34	GC	General Comment / joint	
	38.05	GC	General Comment / joint	
	49.79	GC	General Comment / joint	
	55.77	GC	General Comment / joint	
	61.47	GC	General Comment / joint	
	72.14	GC	General Comment / joint	
	83.91	GC	General Comment / joint	
	85.28	DE	Debris silt, pipe diameter reduced up to 10% / Silt in Line	S
	90.86	IE	Inspection Ends / SSMH 392902	
SSMH 392902				



85.28 m // 00:10:06

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	**0**	**0**	**0**	**1**	**1**	**8**	**0.09**	**8**	**3**

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Inspection Pictures

Job No.:	Asset No.:	Contract No.:	Section No.:	Date:
	931261		**1**	**3/03/2020**

Photo: 1_11A
85.28m, Debris silt, pipe diameter reduced up to 10% / Silt in Line

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Log Sheet

Job No.:	Asset No.:	Contractor.:	Surveyed by:	Date:	Weather:
	931262		**Ryan Winters**	**3/03/2020**	**Dry Weather**
Suburb:	Map / Dir. / Grid:	Page / Northings:	Ref. / Eastings:	Area:	System Code :
Bayswater					

Tot. Length:	**35.80 m**	Material:	**Polyvinyl chloride**	Year Laid:	
Direction:	**Upstream**	Shape:	**Circular pipe**	Purpose:	
Surface.:	**Hotmix**	Dia / HT.:	**150 mm**	Use:	**Foul/sanitary sewer**
Location.:	**Council road - carriageway**	Width:		Type:	

U/S MH/Node No.:	**SSMH 392902**	D/S MH/Node No.:	**SSMH 401878**
Street Name:	**Bayswater Marina**	Street Name:	**Bayswater Marina**
Depth:	**3.3**	Depth:	**3.6**
US Node Type:	**Wastewater manhole**	DS Node Type:	**Wastewater manhole**

Remarks : **Check Condition**

1:285 Position	Code	Observation	Severity
SSMH 401878			
0.00	IS	Inspection Starts / SSMH 401878	
2.45	GC	General Comment / joint	
8.01	GC	General Comment / joint	
19.84	GC	General Comment / joint	
25.64	GC	General Comment / joint	
35.80	IE	Inspection Ends / SSMH 392902	
SSMH 392902			

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**

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Log Sheet

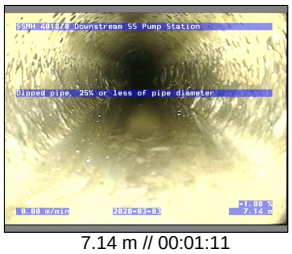
Job No.:	Asset No.:	Contractor.:	Surveyed by:	Date:	Weather:
	914475		**Ryan Winters**	**3/03/2020**	**Dry Weather**
Suburb:	Map / Dir. / Grid:	Page / Northings:	Ref. / Eastings:	Area:	System Code :
Bayswater					

Tot. Length:	**13.91 m**	Material:	**Polyvinyl chloride**	Year Laid:	
Direction:	**Downstream**	Shape:	**Circular pipe**	Purpose:	
Surface.:	**Mown lawn**	Dia / HT.:	**150 mm**	Use:	**Foul/sanitary sewer**
Location.:	**Council road - carriageway**	Width:		Type:	

U/S MH/Node No.:	**SSMH 401878**	D/S MH/Node No.:	**SS Pump Station**
Street Name:	**Bayswater Marina**	Street Name:	**Bayswater Marina**
Depth:		Depth:	
US Node Type:	**Wastewater manhole**	DS Node Type:	**Wastewater pump station**

Remarks : **Check Condition**

1:120	Position	Code	Observation	Severity
SSMH 401878				
	0.00	IS	Inspection Starts / SSMH 401878	
	2.24	GC	General Comment / joint	
	7.14	DP	Dipped pipe, 25% or less of pipe diameter	S
	13.91	IE	Inspection Ends / SS Pump Station	
SS Pump Station				



7.14 m // 00:01:11

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
1	**10**	**0.72**	**10**	**2**	**0**	**0**	**0**	**0**	**1**

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Inspection Pictures

Job No.:	Asset No.:	Contract No.:	Section No.:	Date:
	914475		**3**	**3/03/2020**

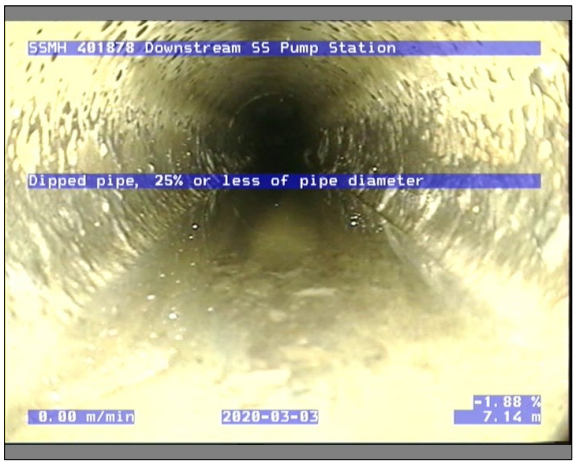

Photo: 3_3A
7.14m, Dipped pipe, 25% or less of pipe diameter

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Log Sheet

Job No.:	Asset No.:	Contractor.:	Surveyed by:	Date:	Weather:
	914473		**Ryan Winters**	**3/03/2020**	**Dry Weather**
Suburb:	Map / Dir. / Grid:	Page / Northings:	Ref. / Eastings:	Area:	System Code :
Bayswater					

Tot. Length:	**15.28 m**	Material:	**Polyvinyl chloride**	Year Laid:	
Direction:	**Upstream**	Shape:	**Circular pipe**	Purpose:	
Surface.:	**Hotmix**	Dia / HT.:	**150 mm**	Use:	**Foul/sanitary sewer**
Location.:	**Council road - carriageway**	Width:		Type:	

U/S MH/Node No.:	**SSMH 401877**	D/S MH/Node No.:	**SSMH 414428**
Street Name:	**Sir Peter Blake Parade**	Street Name:	**Sir Peter Blake Parade**
Depth:	**1.15**	Depth:	**1.3**
US Node Type:	**Wastewater manhole**	DS Node Type:	**Wastewater manhole**

Remarks : **Check Condition**

1:135	Position	Code	Observation	Severity
SSMH 414428				
	0.00	IS	Inspection Starts / SSMH 414428	
	5.79	GC	General Comment / joint	
	11.59	GC	General Comment / joint	
	15.28	IE	Inspection Ends / SSMH 401877	
SSMH 401877				

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**

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Fax:
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Log Sheet

Job No.:	Asset No.:	Contractor.:	Surveyed by:	Date:	Weather:
	931282		**Ryan Winters**	**3/03/2020**	**Dry Weather**
Suburb:	Map / Dir. / Grid:	Page / Northings:	Ref. / Eastings:	Area:	System Code :
Bayswater					

Tot. Length:	**45.57 m**	Material:	**Polyvinyl chloride**	Year Laid:	
Direction:	**Upstream**	Shape:	**Circular pipe**	Purpose:	
Surface.:	**Concrete**	Dia / HT.:	**150 mm**	Use:	**Foul/sanitary sewer**
Location.:	**Council road - carriageway**	Width:		Type:	

U/S MH/Node No.:	**Head Of Line**	D/S MH/Node No.:	**SSMH 401877**
Street Name:	**Sir Peter Blake Parade**	Street Name:	**Sir Peter Blake Parade**
Depth:		Depth:	**1.15**
US Node Type:	**Wastewater manhole**	DS Node Type:	**Wastewater node**

Remarks : **Check Condition**

1:360	Position	Code	Observation	Severity
SSMH 401877				
	0.00	IS	Inspection Starts / SSMH 401877	
	6.01	GC	General Comment / joint	
	17.73	GC	General Comment / joint	
	35.39	GC	General Comment / joint	
	45.57	IE	Inspection Ends / Head Of Line At Existing Building	
Head Of Line				

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**

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Log Sheet

Job No.:	Asset No.:	Contractor.:	Surveyed by:	Date:	Weather:
	914474		**Ryan Winters**	**3/03/2020**	**Dry Weather**
Suburb:	Map / Dir. / Grid:	Page / Northings:	Ref. / Eastings:	Area:	System Code :
Bayswater					

Tot. Length:	**50.39 m**	Material:	**Polyvinyl chloride**	Year Laid:	
Direction:	**Downstream**	Shape:	**Circular pipe**	Purpose:	
Surface.:	**Hotmix**	Dia / HT.:	**150 mm**	Use:	**Foul/sanitary sewer**
Location.:	**Council road - carriageway**	Width:		Type:	

U/S MH/Node No.:	**SSMH 414428**	D/S MH/Node No.:	**SS Pump Station**
Street Name:	**Sir Peter Blake Parade**	Street Name:	**Sir Peter Blake Parade**
Depth:		Depth:	
US Node Type:	**Wastewater manhole**	DS Node Type:	**Wastewater pump station**

Remarks : **Check Condition**

1:405	Position	Code	Observation	Severity
SSMH 414428				
	0.00	IS	Inspection Starts / SSMH 414428	
	9.09	GC	General Comment / joint	
	20.78	GC	General Comment / joint	
	38.34	GC	General Comment / joint	
	50.39	IE	Inspection Ends / SS Pump Station	
SS Pump Station				

STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
0	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**